

frivol

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Chapter 1

Todo List

Member `frivol::fortune_::Algorithm< PolicyT >::finish ()`

Currently unfinished, therefore doesn't return anything.

Chapter 2

Namespace Index

2.1 Namespace List

Here is a list of all documented namespaces with brief descriptions:

frivol::fortune_	
Classes for the implementation of Fortune's algorithm	9

Chapter 3

Class Index

3.1 Class Hierarchy

This inheritance list is sorted roughly, but not completely, alphabetically:

frivol::fortune_::Algorithm< PolicyT >	11
frivol::fortune_::Arc	12
frivol::Array< T >	12
frivol::DummyPriorityQueue< PriorityT >	14
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frivol::GeometryTraits< float >	15
frivol::GeometryTraitsImplementedConcept< CoordT >	16
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frivol::Policy< CoordT, EventQueueT, BeachLineT >	17
frivol::PriorityQueueConcept< X, PriorityT >	18
frivol::SearchTreeConcept< X, ElementT >	18
frivol::Stack< T >	19

Chapter 4

Class Index

4.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

frivol::fortune_::Algorithm< PolicyT >	11
frivol::fortune_::Arc	
Information of an arc in the beach line	12
frivol::Array< T >	12
frivol::DummyPriorityQueue< PriorityT >	
Simple implementation of PriorityQueueConcept	14
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Simple implementation of SearchTreeConcept (a wrapper around <code>std::list</code>)	14
frivol::GeometryTraits< CoordT >	14
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Chapter 5

Namespace Documentation

5.1 `frivol::fortune_` Namespace Reference

Classes for the implementation of Fortune's algorithm.

Classes

- struct [Arc](#)
Information of an arc in the beach line.
- class [Algorithm](#)

Chapter 6

Class Documentation

6.1 `frivol::fortune_::Algorithm< PolicyT >` Class Template Reference

```
#include <frivol_impl.hpp>
```

Public Types

- typedef `PolicyT::Coord` **CoordT**
- typedef `Point< CoordT >` **PointT**

Public Member Functions

- `Algorithm` (const `Array< PointT >` &sites)
- void `step` ()
Run the algorithm one event handling forward.
- `CoordT` `getY` ()
- bool `isFinished` ()
Returns true if the algorithm has finished.
- void `finish` ()

6.1.1 Detailed Description

```
template<typename PolicyT>class frivol::fortune_::Algorithm< PolicyT >
```

State of Fortune's algorithm.

Template Parameters

<i>PolicyT</i>	The algorithm policy to use, instance of <code>Policy</code> template.
----------------	--

6.1.2 Constructor & Destructor Documentation

```
6.1.2.1 template<typename PolicyT > frivol::fortune_::Algorithm< PolicyT >::Algorithm ( const Array< PointT > & sites ) [inline]
```

Constructs algorithm state.

Parameters

<i>points</i>	Reference to the input set of sites. The object must exist throughout the existence of the Algorithm .
---------------	--

6.1.3 Member Function Documentation

6.1.3.1 `template<typename PolicyT > void frivol::fortune_::Algorithm< PolicyT >::finish () [inline]`

Steps the algorithm until the end and returns the result.

Todo Currently unfinished, therefore doesn't return anything.

6.1.3.2 `template<typename PolicyT > CoordT frivol::fortune_::Algorithm< PolicyT >::getY () [inline]`

Get the y coordinate of last [step\(\)](#). Undefined return value if [step\(\)](#) has not been called yet.

The documentation for this class was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/frivol_impl.hpp

6.2 frivol::fortune_::Arc Struct Reference

Information of an arc in the beach line.

```
#include <frivol_impl.hpp>
```

Public Attributes

- Idx [site](#)
The site from which the arc originates.
- Idx [id](#)
The ID of the arc.

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/frivol_impl.hpp

6.3 frivol::Array< T > Class Template Reference

```
#include <array.hpp>
```

Public Member Functions

- [Array](#) (Idx size)
- Idx [getSize](#) () const
Returns the size of the array.
- void [resize](#) (Idx size)
- const T & [operator\[\]](#) (Idx index) const
- T & [operator\[\]](#) (Idx index)

6.3.1 Detailed Description

template<typename T>class frivol::Array< T >

Simple fixed-size array.

Template Parameters

<i>T</i>	The type of stored elements. Should be default constructible.
----------	---

6.3.2 Constructor & Destructor Documentation

6.3.2.1 template<typename T > frivol::Array< T >::Array (*Idx size*)

Creates an array with all elements default-constructed.

Parameters

<i>size</i>	The size of the array.
-------------	------------------------

6.3.3 Member Function Documentation

6.3.3.1 template<typename T > const T & frivol::Array< T >::operator[] (*Idx index*) const

Returns reference to an element in the array.

Parameters

<i>index</i>	The zero-based index of the element.
--------------	--------------------------------------

Exceptions

<i>std::out_of_range</i>	if FRIVOL_ARRAY_BOUNDS_CHECKING is defined and 'index' overflows.
--------------------------	---

6.3.3.2 template<typename T > T & frivol::Array< T >::operator[] (*Idx index*)

Returns reference to an element in the array.

Parameters

<i>index</i>	The zero-based index of the element.
--------------	--------------------------------------

Exceptions

<i>std::out_of_range</i>	if FRIVOL_ARRAY_BOUNDS_CHECKING is defined and 'index' overflows.
--------------------------	---

6.3.3.3 template<typename T > void frivol::Array< T >::resize (*Idx size*)

Resizes the array to size. If size decreases the extra elements are removed. If size increases, the new elements are default-constructed. The operation may assign the current elements to a new place, and therefore pointers to the array may be invalidated.

Parameters

<i>size</i>	The new size.
-------------	---------------

The documentation for this class was generated from the following files:

- /home/topi/unison/Asiakirjat/frivol/frivol/array.hpp
- /home/topi/unison/Asiakirjat/frivol/frivol/array_impl.hpp

6.4 frivol::DummyPriorityQueue< PriorityT > Class Template Reference

Simple implementation of [PriorityQueueConcept](#).

```
#include <priority_queue_concept.hpp>
```

Public Member Functions

- **DummyPriorityQueue** (Idx size)
- std::pair< Idx, PriorityT > **pop** ()
- bool **empty** () const
- void **setPriority** (Idx key, PriorityT priority)
- void **setPriorityNIL** (Idx key)

The documentation for this class was generated from the following files:

- /home/topi/unison/Asiakirjat/frivol/frivol/priority_queue_concept.hpp
- /home/topi/unison/Asiakirjat/frivol/frivol/priority_queue_concept_impl.hpp

6.5 frivol::DummySearchTree< ElementT > Class Template Reference

Simple implementation of [SearchTreeConcept](#) (a wrapper around std::list).

```
#include <search_tree_concept.hpp>
```

Public Types

- typedef std::list< ElementT >::iterator **Iterator**

Public Member Functions

- template<typename FuncT > Iterator **search** (FuncT func)

The documentation for this class was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/search_tree_concept.hpp

6.6 frivol::GeometryTraits< CoordT > Struct Template Reference

```
#include <geometry_traits.hpp>
```

6.6.1 Detailed Description

```
template<typename CoordT>struct frivol::GeometryTraits< CoordT >
```

Traits class that gives needed geometry operations for the algorithm. Implemented traits are required by [Policy](#).

Template Parameters

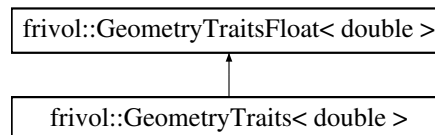
<i>CoordT</i>	The coordinate type to use.
---------------	-----------------------------

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits.hpp

6.7 frivol::GeometryTraits< double > Struct Template Reference

Inheritance diagram for frivol::GeometryTraits< double >:



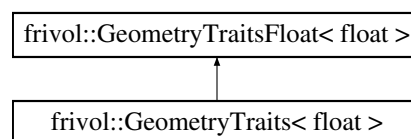
Additional Inherited Members

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits.hpp

6.8 frivol::GeometryTraits< float > Struct Template Reference

Inheritance diagram for frivol::GeometryTraits< float >:



Additional Inherited Members

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits.hpp

6.9 frivol::GeometryTraitsFloat< CoordT > Struct Template Reference

```
#include <geometry_traits.hpp>
```

Static Public Member Functions

- static double **getBreakpointX** (const [Point](#)< CoordT > &a, const [Point](#)< CoordT > &b, CoordT topy)

6.9.1 Detailed Description

template<typename CoordT>struct frivol::GeometryTraitsFloat< CoordT >

Implementation of [GeometryTraits](#) for floating point coordinate types (float and double).

The documentation for this struct was generated from the following files:

- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits.hpp
- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits_impl.hpp

6.10 frivol::GeometryTraitsImplementedConcept< CoordT > Class Template Reference

```
#include <geometry_traits.hpp>
```

6.10.1 Detailed Description

template<typename CoordT>class frivol::GeometryTraitsImplementedConcept< CoordT >

Concept for checking that all required [GeometryTraits](#) are implemented for given coordinate type. Required operations are:

- CoordT getBreakpointX(Point<CoordT> a, Point<CoordT> b, CoordT topy) returns the X coordinate of intersection of the two parabolas defined by $(x-a.x)^2 + (y-a.y)^2 = (y-topy)^2 = (x-b.x)^2 + (y-b.y)^2$ The function may assume that $a.x \leq b.x$, $a.y \leq topy$ and $b.y \leq topy$. The function should choose the solution where the parabola around a goes under the parabola around b.

Template Parameters

<i>CoordT</i>	The coordinate type.
---------------	----------------------

The documentation for this class was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/geometry_traits.hpp

6.11 frivol::Point< CoordT > Struct Template Reference

```
#include <point.hpp>
```

Public Member Functions

- [Point](#) (CoordT x, CoordT y)
- [Point](#) ()

Constructs point with undefined values as coordinates.

Public Attributes

- CoordT [x](#)
The X coordinate of the point.
- CoordT [y](#)
The Y coordinate of the point.

6.11.1 Detailed Description

```
template<typename CoordT = double>struct frivol::Point< CoordT >
```

Two-dimensional point.

Template Parameters

<i>CoordT</i>	The coordinate type to use. Should be default constructible. Defaults to double, which is the coordinate type of DefaultPolicy.
---------------	---

6.11.2 Constructor & Destructor Documentation

6.11.2.1 `template<typename CoordT = double> frivol::Point< CoordT >::Point (CoordT x, CoordT y)` `[inline]`

Constructs point with given coordinates.

Parameters

<i>x</i>	The X coordinate.
<i>y</i>	The Y coordinate.

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/point.hpp

6.12 frivol::Policy< CoordT, EventQueueT, BeachLineT > Struct Template Reference

```
#include <policy.hpp>
```

Public Types

- typedef CoordT **Coord**

6.12.1 Detailed Description

```
template<typename CoordT, template< typename PriorityT > class EventQueueT, template< typename ElementT > class BeachLineT>struct frivol::Policy< CoordT, EventQueueT, BeachLineT >
```

[Policy](#) class for the Fortune's algorithm, specifying data types and data structures to use.

Template Parameters

<i>CoordT</i>	The coordinate type to use. Should be ordered and default constructible to undefined value. Should have specialization of GeometryTraits .
<i>EventQueueT</i>	The priority queue type for events. Must conform to PriorityQueueConcept .
<i>BeachLineT</i>	The search tree to use for the "beach line" of arcs. Must conform to SearchTreeConcept .

The documentation for this struct was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/policy.hpp

6.13 frivol::PriorityQueueConcept< X, PriorityT > Class Template Reference

```
#include <priority_queue_concept.hpp>
```

6.13.1 Detailed Description

```
template<typename X, typename PriorityT>class frivol::PriorityQueueConcept< X, PriorityT >
```

Concept checking class for priority queues X with priority values of type PriorityT (or NIL). Priority queues are initialized with given size, and contain priority values for keys 0, 1, ..., size-1. Initially, all priority values are NIL. X must support the following operations:

- <construct>(Idx size) creates priority queue for keys 0, 1, ..., size-1.
- bool empty() const returns true if all keys have NIL priority.
- std::pair<Idx, PriorityT> pop() returns pair of a key with lowest non-NIL priority and its priority and sets the priority to NIL.
- void setPriority(Idx key, PriorityT priority) sets the priority value of 'key' to non-NIL value 'priority'.
- void setPriorityNIL(Idx key) sets the priority value of key 'key' to NIL.

X may assume that PriorityT is ordered with <-operator. X may have undefined behavior if supplied keys are out of range or if pop() is called when empty() returns true.

The documentation for this class was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/priority_queue_concept.hpp

6.14 frivol::SearchTreeConcept< X, ElementT > Class Template Reference

```
#include <search_tree_concept.hpp>
```

Public Types

- typedef X::iterator **IteratorT**

6.14.1 Detailed Description

```
template<typename X, typename ElementT>class frivol::SearchTreeConcept< X, ElementT >
```

Concept checking class for search trees X for elements of type ElementT. Search trees are sequence containers, the elements of which are iterated using iterator objects of type X::iterator. The iterator must be a standard bidirectional iterator. X must support the following operations:

- <construct>() creates empty search tree.
- bool empty() const returns true if the search tree is empty.

- Iterator begin() returns the iterator of the first element (or past-the-end if empty).
- Iterator end() returns the iterator past the last element.
- template<typename FuncT> Iterator search(FuncT func) searches the sequence using the supplied int(-iterator)-function that for given iterator iter returns negative if the searched element is before iter, positive if it is after iter, and 0 if it is the right element. If an element such that func returns 0 is found, it is returned, otherwise end() is returned.
- void erase(Iterator iter) removes element at iter. Other iterators should not be invalidated.
- void insert(Iterator iter, const ElementT& elem) inserts elem before iter. Does not invalidate any iterators.

X may assume that ElementT is copy constructible.

The documentation for this class was generated from the following file:

- /home/topi/unison/Asiakirjat/frivol/frivol/search_tree_concept.hpp

6.15 frivol::Stack< T > Class Template Reference

```
#include <stack.hpp>
```

Public Member Functions

- [Stack](#) ()
Constructs empty stack.
- bool [empty](#) () const
Returns true if the stack is empty.
- T & [top](#) ()
- void [pop](#) ()
Removes the top element of the stack. Call only if [empty\(\)](#) is false.
- void [push](#) (const T &element)

6.15.1 Detailed Description

```
template<typename T>class frivol::Stack< T >
```

[Stack](#) of elements.

Template Parameters

<i>T</i>	The type of stored elements. Should be default constructible.
----------	---

6.15.2 Member Function Documentation

6.15.2.1 template<typename T> void frivol::Stack< T >::push (const T & *element*)

Pushes element to the top of the stack.

Parameters

<i>element</i>	The element to push.
----------------	----------------------

6.15.2.2 `template<typename T> T & frivol::Stack< T >::top ()`

Returns reference to the top element of the stack. Call only if `empty()` is false.

The documentation for this class was generated from the following files:

- `/home/topi/unison/Asiakirjat/frivol/frivol/stack.hpp`
- `/home/topi/unison/Asiakirjat/frivol/frivol/stack_impl.hpp`